



**A.** Plasmodiocarp on twig (bar = 1 mm). **B.** Plasmodiocarp detail (bar = 1 mm). **C.** Capillitium (bar = 10 µm). **D.** Capillitium and spores (bar = 10 µm) [Photographs: A. Michaud].

**Lepidoderma carestianum** (Rabenh.) Rostaf., *Śluzowce (Mycetozoa) Monografia* Paris: 188 (1874, publ. 1875). [Index Fungorum 182525]  
*Reticularia carestiana* Rabenh., *Fungi Europei Exsiccati* no. 436 (1862). [Index Fungorum 143948]  
*Didymium granuliferum* W. Phillips, *Grevillea* 5(no. 35): 114 (1877). [Index Fungorum 174748]  
*Badhamia granulifera* (W. Phillips) Masee, *Monograph of the Myxogastres* London: 321 (1892). [Index Fungorum 306804]  
*Lepidoderma granuliferum* (W. Phillips) R.E. Fr., *Arkiv för Botanik* 6(7): 3 (1906). [Index Fungorum 247041]  
*Lepidoderma carestianum* var. *granulifera* (W. Phillips) G. Lister, *Colorado College Publication Science Series* 6: 63 (1906). [Index Fungorum 243356]  
*Lepidoderma carestianum* var. *flavescens* Meyl., *Bulletin de la Société Vaudoise des Sciences Naturelles* 44: 292 (1908). [Index Fungorum 182692]

*Lepidoderma carestianum* f. *roseum* Meyl., *Bulletin de la Société Vaudoise des Sciences Naturelles* **46**: 50 (1910). [*Index Fungorum* 539721]

*Lepidoderma carestianum* f. *brunnescens* Meyl., *Bulletin de la Société Vaudoise des Sciences Naturelles* **55**: 241 (1924). [*Index Fungorum* 539719]

*Lepidoderma carestianum* f. *pulverulenta* Meyl., *Bulletin de la Société Vaudoise des Sciences Naturelles* **56**: 321 (1927). [*Index Fungorum* 539720]

*Diagnostic features.* A nivicolous species with a flattish continuous plasmodiocarp covered with tiny lime scales.

*Sporocarps* as individual sporangia 0.5–1.5 mm diam., or as plasmodiocarps up to 1(–2) cm long, dull or usually slightly iridescent, dark brown to bluish grey, usually sessile, covered with lime scales 20–60 µm diam., usually white or grey, and occasionally united to form a thick outer crust; stalk, when present, stout, dark, up to 0.2 mm long. *Hypothallus* thin, transparent, yellowish to dark brown, continuous, often scattered with lime scales. *Peridium* membranous or subcartilaginous, usually thin. *Columella* usually present, variable in shape, forming a ridge in plasmodiocarps, usually c. 50% diam. of an individual sporangium, white, cream to pale brown, darker when less developed, filled with large lime scales. *Capillitium* abundant, weakly attached to the peridium and columella, threads usually flexuose, uniform in diam., commonly branched and anastomosed to form a wide-meshed net, dark purple-brown, the tips colourless, not noticeably tapered, smooth but often bearing spherical to fusiform thickenings. *Spores* in mass dark purple-brown to black, individually brown, often paler on one side, globose to ellipsoid, 10–15 µm diam., distinctly and densely spinulose. *Plasmodium* white, or sometimes perhaps dingy white and black.

**ASSOCIATED ORGANISMS & SUBSTRATA:** **Plantae.** *Deschampsia cespitosa* (L.) P. Beauv. (leaf, litter); *Empetrum nigrum* subsp. *hermaphroditum* (Hagerup) Böcher (shoot); *Gramineae* indet.; *Juncus trifidus* L. (leaf); *Nardus stricta* L. (stem); *Plantae* indet. (bark, litter, twig); *Rubus idaeus* L. (branch); *Sasa kurilensis* Makino & Shibata (stem); *Taxus* sp.; *Vaccinium myrtillus* L. **Other substrata.** Soil.

**INTERACTIONS & HABITATS:** The ecological rôle played by myxomycetes (see Notes below) remains poorly understood. In general, these organisms are thought to be mainly saprobic, feeding only during their vegetative (also called ‘plasmodial’) state, and not feeding when in their fruiting state. They may be encountered on living plant material (e.g. leaves and twigs) in both vegetative and fruiting states, but in such cases the plant material is only a substratum, not a source of nutrition. When myxomycetes are found in their vegetative state specifically on dead plant material, that material may be both a substratum and a source of nutrition. It is also possible that, in their vegetative state, myxomycetes feed on dead animal remains, living and dead bacteria, fungal hyphae and spores, and other organic material. Nothing is known about interactions between the present species and other organisms, but its associated organisms, ecological preferences and geographical distribution suggest that, in interactions, it is similar to this general picture. *Lepidoderma carestianum* is one of the so-called ‘nivicolous’ or snowline myxomycetes, found on both living and dead plant material next to melting snow patches in mountainous habitats, typically where there is high insolation in spring. In the ‘nivicolous’ habitat, snow cover prevents abrupt soil temperature changes between night and day, provides free water and a ground-level microclimate beneath or near the melting snow favourable for development of vegetative and fruiting stages. RONIKIER & RONIKIER (2009), reviewing this ecological group, found they were typically montane, i.e. upland forest zone, in distribution rather than subalpine or alpine. There are records varying in altitudinal range from 400 to 4100 m above mean sea level, but the species is most often found from 1100 to 1600 m.

**GEOGRAPHICAL DISTRIBUTION:** NORTH AMERICA: Canada (Ontario), USA (Arizona, California, Colorado, Iowa, Kansas, Massachusetts, Michigan, New Hampshire, New Mexico, Washington). ASIA: Japan, Russia (Chukotskyi Avtonomnyi okrug). AUSTRALASIA: Australia (New South Wales), New Zealand. EUROPE: Austria, Denmark, France, Italy, Norway, Poland, Russia (Leningradskaya oblast, Murmansk oblast), Slovenia, Spain, Sweden, Switzerland, UK, Ukraine.

**ECONOMIC IMPACTS:** Lack of information makes it impossible to place a monetary value on the ecological rôle of this species. There are no reports of it causing economic damage to crops or other organisms of value to humans, or of its use by humans. Each year, a few field meetings are organized in Europe devoted to the study of nivicolous myxomycetes, which therefore collectively generate low levels of nature tourism.

**INFRASPECIFIC VARIATION:** Several subspecific taxa have been described, mostly now not recognized as different from the type. *Lepidoderma carestianum* var. *chailletii* (Rostaf.) G. Lister is a synonym of *L. chailletii* Rostaf. (see *IMI Descriptions* **1837**). There are in addition the following invalidly published or otherwise dubious subspecific epithets: '*L. carestianum* f. *caesium* Meyl.', '*L. carestianum* f. *calcitepartie* Meyl.', '*L. carestiana* f. *discina* Meyl.', '*L. carestianum* f. *macrosporium* Poulain, Mar. Mey. & Bozonnet', and '*L. carestianum* f. *plasmodiocarpa* Meyl.'. Further information on these may be found on the website <http://eumycetozoa.com>.

**DISPERSAL & TRANSMISSION:** By spores. Insects may play a significant rôle in dispersal, as myxomycete spores are regularly found in their faeces. Other forms of spore dispersal probably include wind and melt water.

**CONSERVATION STATUS: Information base.** Over 500 records from 1875 to 2008. The species has been recorded in January, March, April, May, June, July, August, October, November, December, with the main fruiting season in the northern hemisphere from April to June. It is listed in the 'Red Book' of Leningrad oblast, Russia (DEDOV, 2005). **Threats.** This species is threatened by climate change. The strong association between 'nivicolous' myxomycetes and melting snow patches suggests that their distribution is likely to be strongly and negatively affected by global warming as winter snow cover diminishes in mountain regions. This is likely to result in these species gradually moving to higher altitudes and then becoming isolated at the tops of high mountains with no opportunity to move to higher latitudes. **Evaluation.** Using IUCN criteria (IUCN SPECIES SURVIVAL COMMISSION. 2006 *IUCN Red List of Threatened Species*, [www.iucnredlist.org](http://www.iucnredlist.org). Downloaded on 15 May 2006), the species is assessed globally as near threatened. **In situ.** There are no known conservation plans or activities specifically prepared for this species. **Ex situ.** No preserved living strains of this species are listed by the *World Federation of Culture Collections* (<http://wdcm.nig.ac.jp/wfcc/datacenter.html>).

**NOTES:** The list of synonyms follows the taxonomy in <http://eumycetozoa.com>. *Lepidoderma carestianum* is a myxomycete, i.e. a member of the protozoan phylum *Mycetozoa*. Although not strictly fungi, myxomycetes (also known as 'slime moulds') have been studied traditionally by mycologists.

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Sources additional to those already cited from literature and the internet include:

- **On-line databases.** *Fungal Records Database for the British Isles*, <http://194.203.77.76/fieldmycology/>, 7 records.  
*Global Biodiversity Information Facility*, <http://data.gbif.org>, 550 records.
- **Personal communication.** M. Meyer.

See also the following internet pages:

- <http://eumycetozoa.com>;
- <http://slimemold.uark.edu>;
- [www.discoverlife.org/mp/20m?kind=Lepidoderma+carestianum](http://www.discoverlife.org/mp/20m?kind=Lepidoderma+carestianum).

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